**REMARKS**

Claims 1-4, 6, 7, 9, and 11-28 are now in the application.

In the Office Action, the Examiner rejected claims 20, 21, and 23 under 35 U.S.C. §102 as being anticipated by the Cook patent.

The Cook patent discloses a sensor die 10 and a buffer member 12. An electronic circuit 18 and three conductive pads 20, 22 and 24 are provided on a first surface 14 of the sensor die 10. A cavity 44 is etched in a second surface 16 of the sensor die 10 to form a diaphragm 50. An opening 36 is formed through the buffer member 12, and a channel 40 is formed in a surface 30 of the buffer member 12 and is disposed in fluid communication with the opening 36. A fluid conduit 60 is attached to the buffer member 12 so that fluid communication is established between the fluid conduit 60, the opening 36, the channel 40, and the cavity 44, which permits pressure sensing components 51 on the diaphragm 50 to sense the pressure in the fluid conduit 60.

As shown in Figure 7 of the Cook patent, the buffer member 12 is disposed above the sensor die 10, a first housing member 80 has the fluid conduit 60

extending therethrough, and a second housing member 84 is shaped to mate with the first housing member 80 with the sensor die 10 and the buffer member 12 therebetween. The fluid conduit 60 is in fluid communication with the opening 36 of the buffer member 12. A seal 90 is provided between the buffer member 12 and the first housing member 80 around the fluid conduit 60. In order to provide electrical communication between the contact pads 20, 22 and 24 and external devices, a plurality of electrically conductive leads 94 extend through the second housing member 84. An elastomeric conductor 98 is disposed in contact with the contact pads 20, 22 and 24 and the electrically conductive leads 94. A second fluid conduit 100 is provided through the housing member 84 in order to permit the pressure sensor to be used to measure differential pressures.

Independent claim 20 is directed to a method of determining flow rate through a flow conductor in which a pressure change is created within a housing having only two separate housing portions, the pressure change is sensed using a sensing element mounted within the housing, the sensing element is sealed within the housing using a seal, and an electrical signal is communicated from the sensing element to an exterior of the housing.

The Cook patent does not disclose the step of creating a pressure change within a housing having only two separate housing portions. More specifically, while the arrangement shown in Figure 7 can be used to sense a pressure differential, and while this pressure differential may exist within the housing comprising the housing members 80 and 84, there is no disclosure in the Cook patent that the pressure differential is created within this housing members 80 and 84.

Indeed, as far as the disclosure of the Cook patent is concerned, the pressure differential is created outside of the housing. For example, there is no disclosure of a restriction within the Cook housing that would create a pressure differential.

The Examiner asserts that the Cook patent at column 7, lines 18-28 teaches creating a pressure within the housing. However, the Cook patent merely discloses that the pressure sensor can be used to measure differential pressures. This portion of the Cook patent does not disclose that the pressure differential is created within the housing.

Accordingly, because the Cook patent does not disclose creating a pressure within the housing, the Cook patent does not anticipate independent claim 20.

Moreover, there is not disclosure in the Cook patent of determining a flow rate.

Accordingly, for this reason also, the Cook patent does not anticipate independent claim 20.

Further, independent claim 20 is not obvious over the Cook patent because the Cook patent does not suggest creating the pressure differential within the housing.

Because independent claim 20 is patentable over the Cook patent, dependent claims 21 and 23 are likewise patentable over the Cook patent.

In the Office Action, the Examiner rejected claims 1, 2, 6-9, 11, 12, 15-17, and 19 under 35 U.S.C. §103 as being unpatentable over the Frick patent in view of the Cook patent.

The Frick patent discloses a pressure transmitter 10 having four major (and separate) components, an input/output unit 12, a pressure transducer 14, a flange 16, and an orifice 28/30. The input/output unit 12 is connected to the pressure transducer 14 by a neck 18, the flange 16 is connected by pipes 24 and 26 to the orifice 28/30, and the flange 16 is mounted to the pressure transducer 14 by bolts 27.

The pipe 24 is connected to one side of the orifice 28/30, and the pipe 26 is connected to the other side of the orifice 28/30. The orifice 28/30 provides a pressure drop as a function of flow through a conduit 32. The pipe 24 is connected to a passageway 36 in the flange 16, and the pipe 26 is connected to a passageway 38 in the flange 16.

The passageways 36 and 38 couple the pipes 24 and 26 to fluid chambers 40 and 42 of the flange 16. The fluid chambers 40 and 42 cooperate with first and second pressure sensing and transmitting means formed in the pressure transducer 14 when the flange 16 and the pressure transducer 14 are mated together. The first and second pressure sensing and transmitting means comprise isolation diaphragms 50 and 52 disposed in the pressure transducer 14.

The isolation diaphragms 50 and 52 are joined at their rims 54 and 54A to the pressure transducer 14. Seals 58, such as O-ring seals, are interposed between the pressure transducer 14 and the flange 16 annular to the rims 54 and 54a of the isolation diaphragms 50 and 52 in order to seal the fluid chambers 40 and 42.

Fluid cavities 61 and 63 are formed in the transducer 14 such that the isolation diaphragm 50

isolates the fluid chamber 40 from the fluid cavity 61 and such that the isolation diaphragm 52 isolates the fluid chamber 42 from the fluid cavity 63. Fluid conduits 62 and 64 couple the fluid cavities 61 and 63 to a sensor element 66 of the input/output unit 12. The fluid conduits 62 and 64 are filled with a substantially incompressible fluid 65. A measuring diaphragm 72 of the sensor element 66 separates chambers 68 and 70.

A differential pressure is developed by the orifice 28/30 and is conveyed by the pipes 24 and 26 through the passageways 36 and 38 to the chambers 40 and 48 where the differential pressure acts on the isolation diaphragms 50 and 52. This differential pressure deflects the isolation diaphragms 50 and 52 to create a differential pressure in the fluid cavities 61 and 63, and this differential pressure is transmitted through the incompressible fluid 65 in the fluid conduits 62 and 64 to the chambers 68 and 70 of the sensor element 66.

The sensor element 66 is externally excited by input/output unit 12 via the electrical leads 74. In response to the differential pressure in the chambers 68 and 70, the measuring diaphragm 72 deflects to vary the capacitance of the sensor element 66, which alters the external exciting signal. This change in the exciting

signal is representative of the differential pressure and is transmitted through the electrical leads 74 and through the input/output unit 12 to external leads 15.

Alternatively, the Frick patent discloses that the sensor element 66 may be located near the isolation diaphragms 50 and 52 and may be supported in the transducer 14 instead of in the input/output unit 12. The Frick patent also discloses that the first and second pressure sensing and transmitting means may directly sense fluid pressure such as when they comprise strain gauges. However, the Frick patent does not disclose how the pressure transducer 14 is to be modified to accommodate such alternatives.

The Frick patent further discloses that a calibration manifold 17 may be used instead of the flange 16 between the pipes 24, 26 and the pressure transducer 14. The calibration manifold 17 includes three valves 84, 86, and 88 that may be adjusted to permit calibration of the pressure transmitter 10.

Independent claim 1 is directed to a flow sensor package comprising a housing, a sensing element, a restriction, and a seal. The housing has an inlet, an outlet, and first and second channels in communication with the inlet and the outlet. The sensing element is in

the first channel, and the restriction is in the second channel. The seal engages the sensing element so as to prevent flow of a fluid past the sensing element, the seal has an electrically conductive path from the sensing element to a lead, and the lead is outside of the housing.

At the outset, it is noted that the Examiner has misapplied the Frick patent to independent claim 1. The Examiner maintains that the element 88 as disclosed in the Frick patent is a restriction that creates a differential pressure. However, the element 88 is described as a valve and its function, according to the Frick patent, is to selectively enable and disable fluid pressure exchange between the first and second fluid passageways 36A and 38A. In other words, the valve 88 is either open or closed. When the valve 88 is closed, the differential pressure created by the orifice 28/30 is allowed to act differentially on the isolation diaphragms 50 and 52, and the output of the sensor element 66 reflects this differential pressure. On the other hand, when the valve 88 is open, the pressure in the passageways 36 and 38 equalize so that there is no pressure differential applied to the sensor element 66.

Therefore, as can be seen from the above, the valve 88 is not a restriction.

Moreover, the Examiner recognizes that the Frick patent fails to teach the invention of independent claim 1 in a number of respects. Therefore, the Examiner relies on the Cook patent. However, the Examiner is rather vague about how the pressure sensor disclosed in the Frick patent should be modified in view of the Cook patent to meet the limitations of independent claim 1.

For example, as the Examiner recognizes, the sensor element 66 is not in the first channel 36A (or in the second channel 38A), as the Examiner interprets the Frick patent vis-à-vis independent claim 1. Moving the sensing element 66 to the first channel 36A (or the second channel 38A) does not make sense because there is no differential pressure in either of these channels. The differential pressure exists only across these channels 36A and 38A.

The Examiner appears to assert, however, that it would have been obvious in view of the Cook patent to move the sensor element 66 directly across the first channel 36A and the second channel 38A in order to make the sensor small and compact. Yet, such a modification is directly contrary to the teaching of the Frick patent, which instead discloses a need to isolate the sensor

element 66 from the first and second channels 36A and 38A.

The Examiner further recognizes that the Frick patent fails to disclose a conductive seal that engages the sensor element 66 and that conducts signals from the sensor element 66 to outside of the housing. The Frick patent does disclose a pair of seals 58. However, these seals do not engage sensor element 66 and they are not disclosed in the Frick patent as being conductive.

The Examiner appears to assert that it would have been obvious in view of the Cook patent to not only move the sensor element 66 directly across the first channel 36A and the second channel 38A, but to also seal this sensor element 66 with the conductive seal 98 disclosed in the Cook patent. However, the sensor element 66 disclosed in the Frick patent is a capacitive type sensor, and the Examiner has not suggested how such a capacitive sensor element can be sealed by the seal 98 disclosed in the Cook patent without interfering with the operation of the sensor element 66. That is, the Examiner has not suggested why electrical contact between the capacitive type sensor element 66 disclosed in the Frick patent and the conductive seal 98 disclosed in the

Cook patent would not impair the operation of the sensor element 66.

Accordingly, the Examiner has not carried the burden of establishing a prima facie case of obvious with respect to independent claim 1.

Therefore, because the Frick patent fails to teach a restriction in the first channel 36A (or, for that matter, in the second channel 38A), because the Frick patent teaches away from moving the sensor element 66 to a position where it is directly between the first and second channels 36A and 38A, and because the Examiner has not carried the burden of establishing a prima facie case of obvious with respect to sealing the sensor element 66 by way of a conductive seal, independent claim 1 would not have been obvious over the Frick patent in view of the Cook patent.

Because independent claim 1 would not have been obvious over the Frick patent in view of the Cook patent, dependent claims 2 and 6-9 likewise would not have been obvious over the Frick patent in view of the Cook patent.

Independent claim 11 is directed to a flow sensor package comprising a housing, an inlet, an outlet, first and second channels in communication with the inlet and the outlet, a sensing element, a restriction, and a

seal. The sensing element is in the first channel, the sensing element has first and second opposing sides, the first side is in fluid communication with the inlet, and the second side is in fluid communication with the outlet. The restriction is in the second channel, and the restriction permits flow of a liquid through the inlet, the second channel, and the outlet. The seal engages the sensing element so as to prevent flow of the liquid past the sensing element, and the sensing element senses a pressure change across the restriction.

As indicated above in connection with independent claim 1, the Examiner has misapplied the Frick patent to independent claim 11. The valve 88 as disclosed in the Frick patent is not a restriction that creates a differential pressure. The function of the element 88 is to selectively enable and disable fluid pressure exchange between the first and second fluid passageways 36A and 38A.

Moreover, the Examiner recognizes that the sensor element 66 disclosed in the Frick patent is not in the first channel 36A (or in the second channel 38A). Moving the sensing element 66 to the first channel 36A (or the second channel 38A) will not meet the language of independent claim 11 because there is no differential pressure in the first channel 36A (or in the second

channel 38A). The differential pressure exists only across these channels 36A and 38A.

Also, moving the sensor element 66 to the first channel 36A (or to the second channel 38A) would not meet the language of independent claim 11 because then, while the first side of the sensing element 66 would be in fluid communication with the inlet, the second side of the sensor element 66 would not be in fluid communication with the outlet. The isolation diaphragms 50 and 52 would prevent the second side of the sensor element 66 from being in fluid communication with the outlet.

Additionally, it would not have been obvious in view of the Cook patent to move the sensor element 66 directly across the first channel 36A and the second channel 38A in order to make the sensor small and compact, as asserted by the Examiner. Such a modification is directly contrary to the teaching of the Frick patent, which instead discloses a need to isolate the sensor element 66 from the first and second channels 36A and 38A.

Therefore, because the Frick patent fails to teach a restriction in the first channel 36A (or in the second channel 38A), because moving the sensor element 66 to the first channel 36A (or to the second channel 38A)

would not meet the language of independent claim 11, and because the Frick patent teaches away from moving the sensor element 66 to a position where it is directly between the first and second channels 36A and 38A, independent claim 11 would not have been obvious over the Frick patent in view of the Cook patent.

Because independent claim 11 would not have been obvious over the Frick patent in view of the Cook patent, dependent claims 12, 15-17, and 19 likewise would not have been obvious over the Frick patent in view of the Cook patent.

In the Office Action, the Examiner rejected claims 3, 4, 13, 14, and 22-24 under 35 U.S.C. §103 as being unpatentable over the Frick patent in view of the Cook patent and further in view of the Maurer patent.

The Maurer patent discloses a piezoresistive pressure transducer 10 that has a housing comprising first and second pieces 12 and 20. The first piece 12 has a cavity 14 which extends part way through the first piece 12. A pressure port 17 of the first piece 12 communicates with the cavity 14. Leads 18a pass through the first piece 12 into the cavity 14. The second piece 20 has a pressure port 24. First and second elastomeric seals 30 and 32 are in the cavity 14. A square chip 34 is between the first and second elastomeric seals 30 and 32 and forms a central diaphragm 42. The chip 34 carries

piezoresistive stress sensitive elements. The first elastomeric seal 30 is adapted to selectively conduct current from the piezoresistive stress sensitive elements on the chip 34 to the leads 18a. The two seals 30 and 32 and the chip 34 create a pressure tight seal across the central diaphragm 42.

With respect to independent claims 1, 11, and 20, the Maurer patent is redundant. Therefore, the Maurer patent does not supply any of the deficiencies of the Frick and Cook patents with respect to these claims.

Accordingly, independent claims 1, 11, and 20 would not have been obvious over the Frick patent in view of the Cook patent and further in view of the Maurer patent.

Because independent claims 1, 11, and 20 would not have been obvious over the Frick patent in view of the Cook patent and further in view of the Maurer patent, dependent claims 2-4, 6, 7, 9, 12-19, and 21-24 likewise would not have been obvious over the Frick patent in view of the Cook patent and further in view of the Maurer patent.

Newly added dependent claim 25 recites that the step in independent claim 20 of creating a pressure change within a housing comprises the step of creating the pressure change within the housing by use of a restriction. The valve 88 disclosed in the Frick patent

is not a restriction. Therefore, dependent claim 25 is patentable.

Newly added dependent claim 26 recites that the seal in independent claim 1 comprises a perimeter commensurate with a perimeter of the sensing element. The Frick patent and the Cook patent do not show seals that both are conductive and have perimeters commensurate with a perimeter of the sensing element. Therefore, dependent claim 25 is patentable.

Newly added dependent claims 27 and 28 recite that the seal is coaxial with the sensing element. The Frick patent and the Cook patent do not show seals that both are conductive and are coaxial with the sensing element. Therefore, dependent claims 27 and 28 are patentable.

**CONCLUSION**

In view of the above, it is clear that the claims of the present application patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

SCHIFF, HARDING, & WAITE
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606-6402
(312) 258-5774

By: _____
Trevor B. Joike
Reg. No: 25,542

May 1, 2003